Figure 1

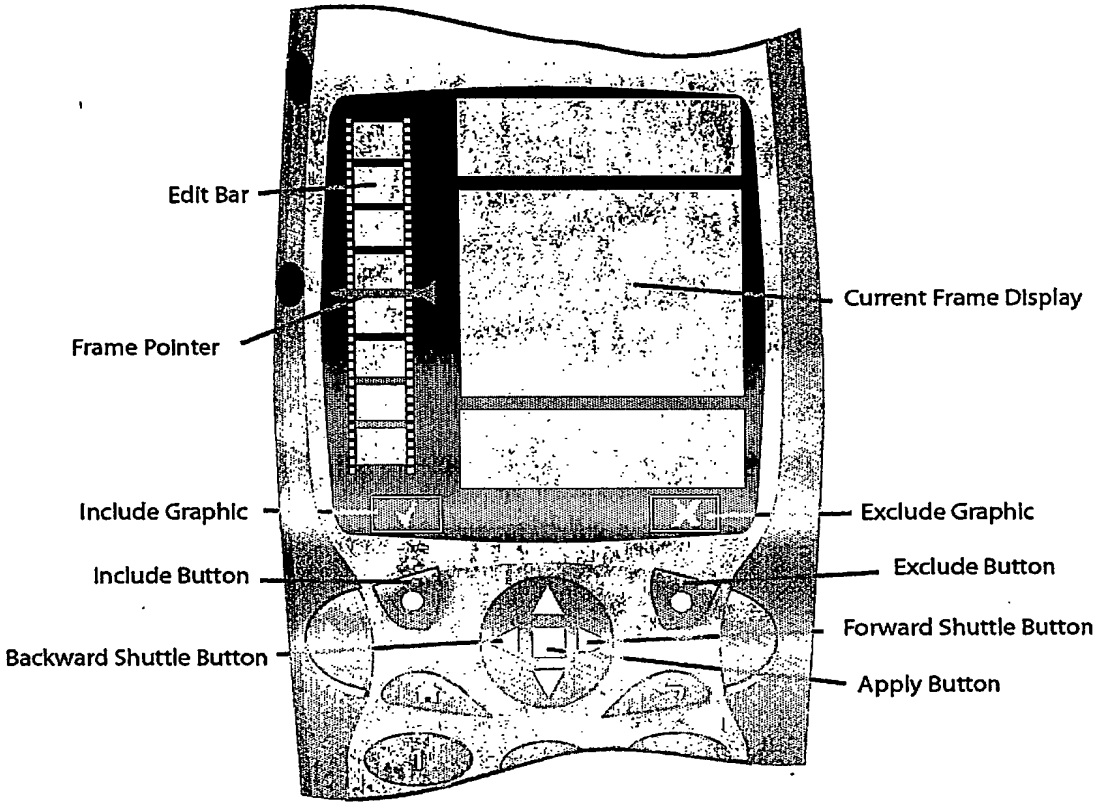


Figure 2

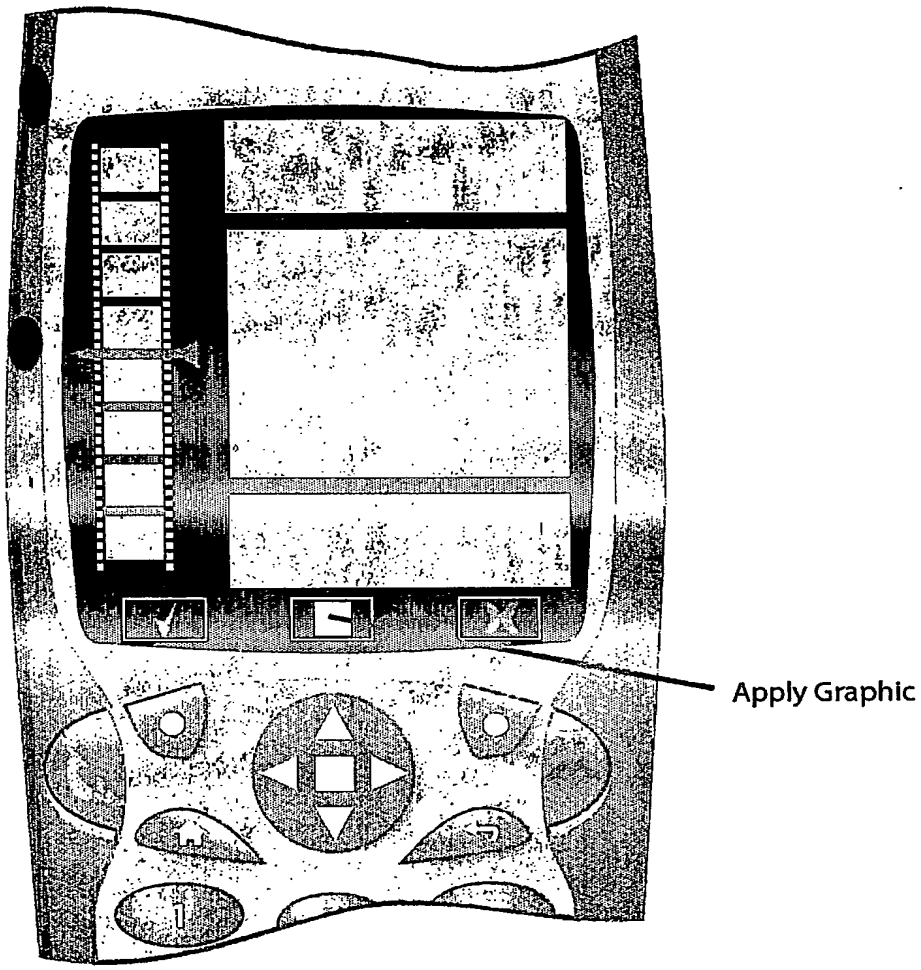


Figure 3

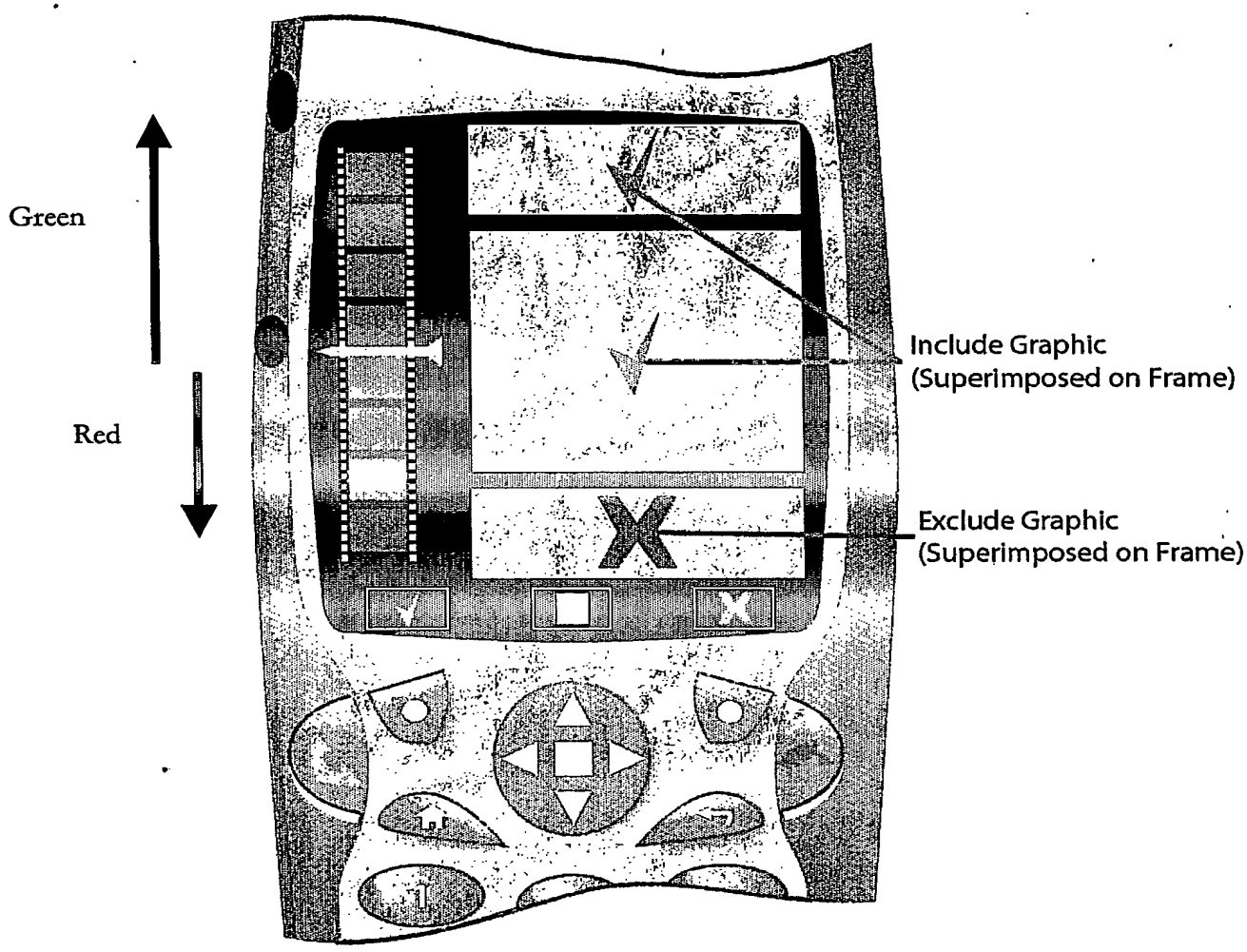

Green
Red
Include Graphic
(Superimposed on Frame)
Exclude Graphic
(Superimposed on Frame)

Figure 4

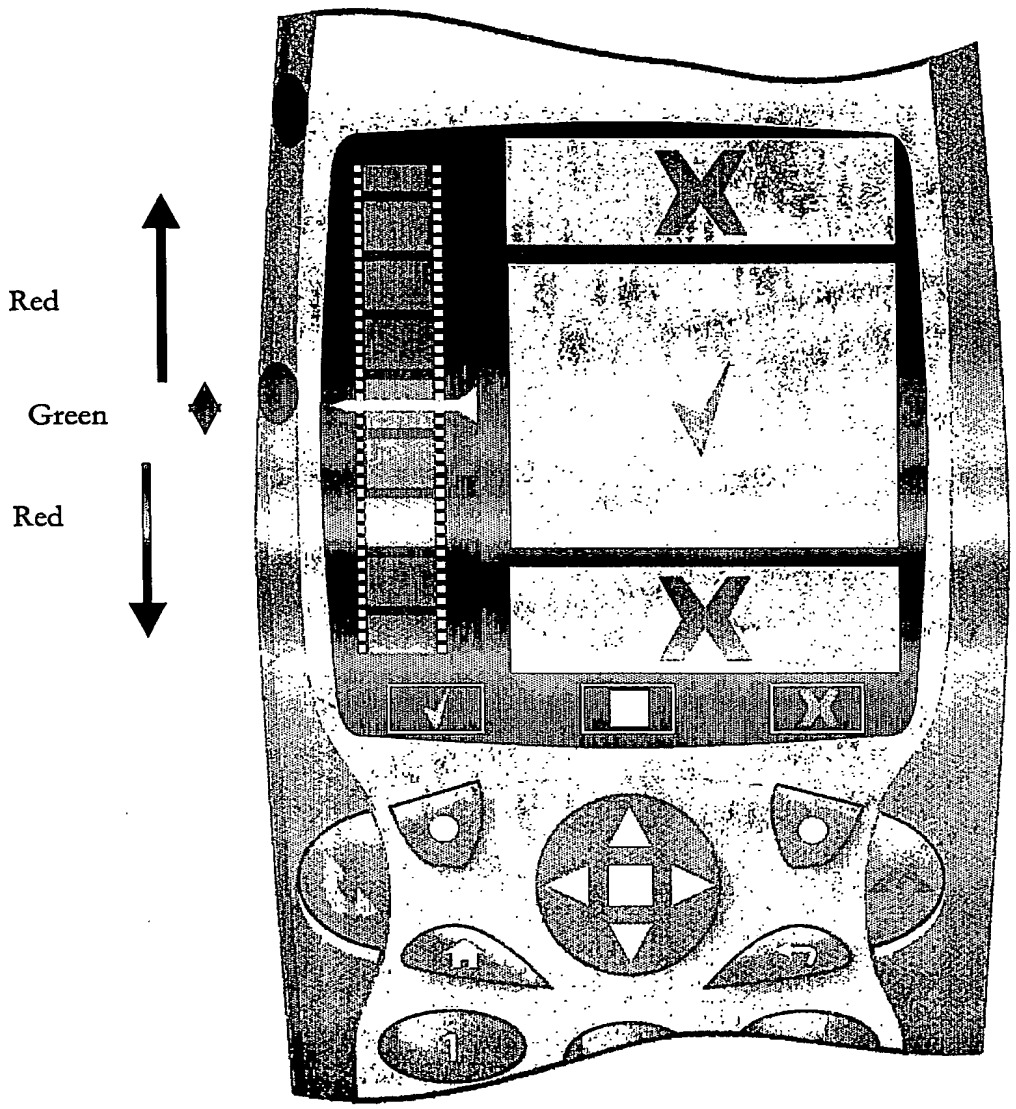


Figure 5

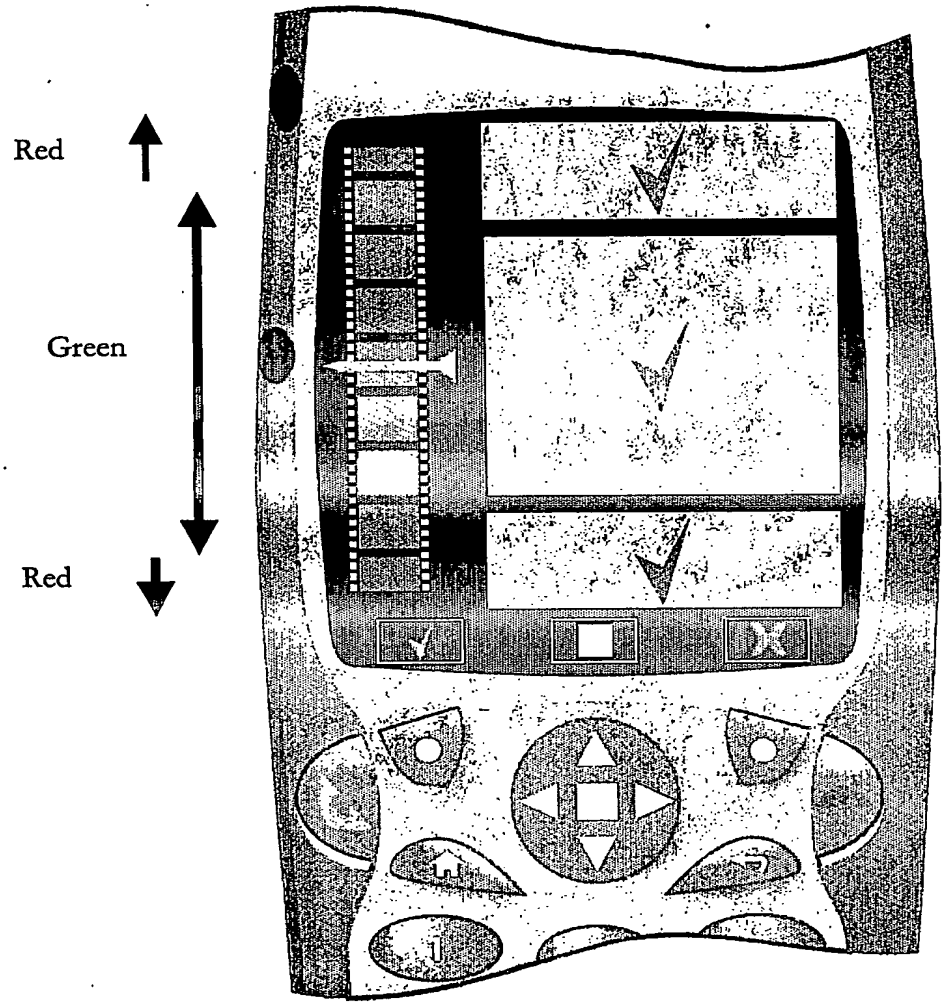


Figure 6

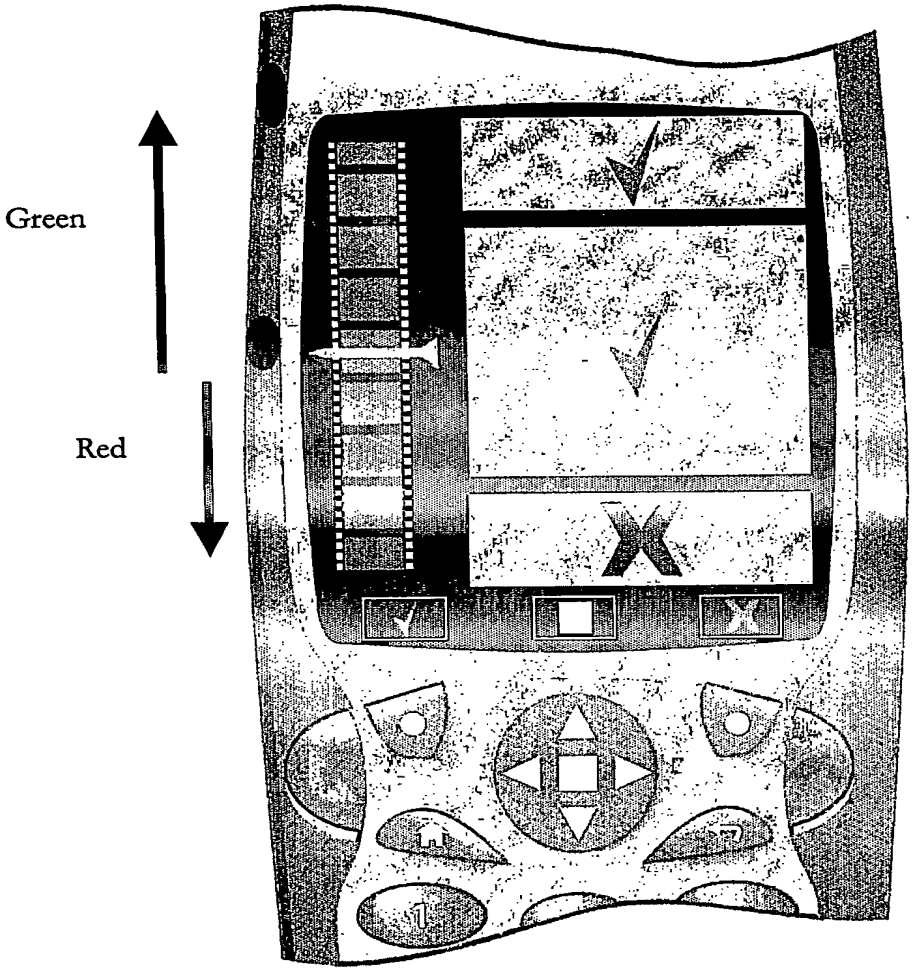


Figure 7

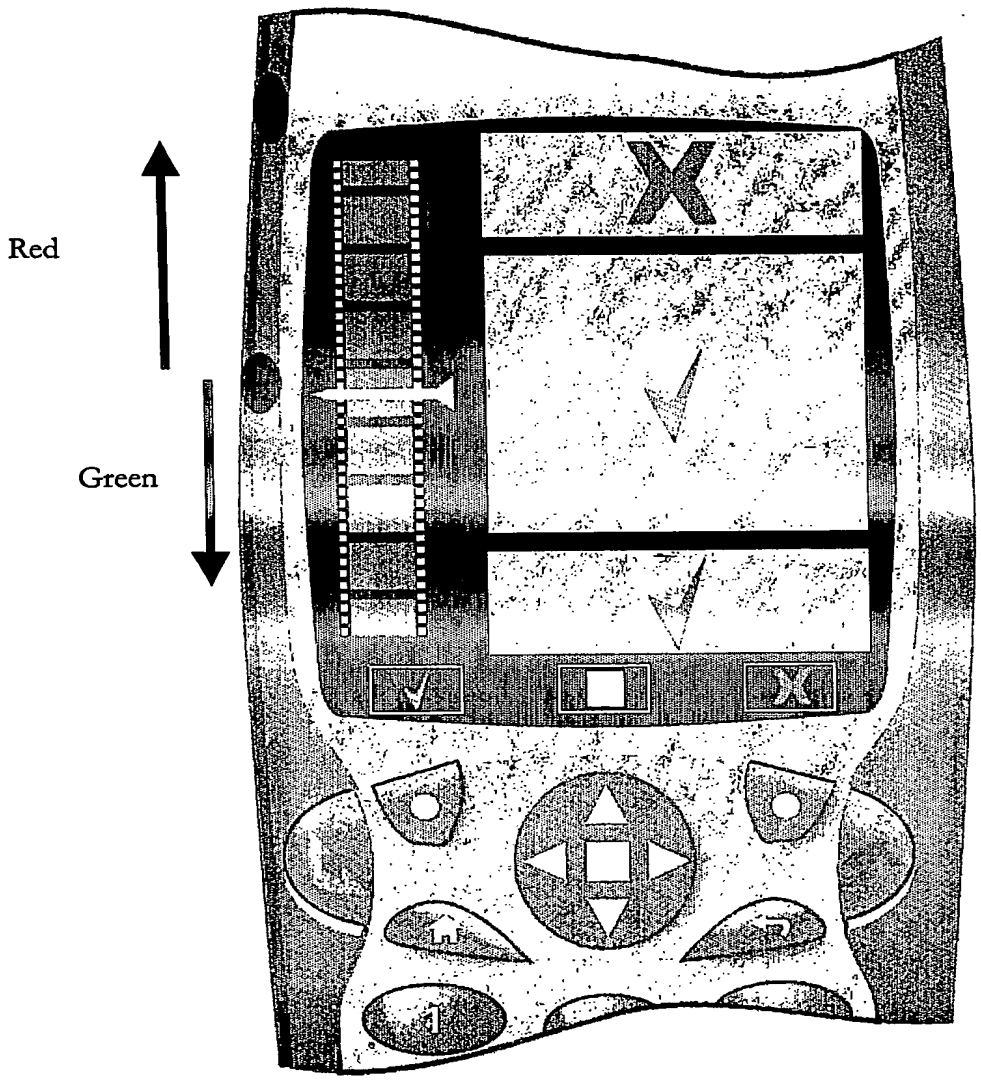


Figure 8

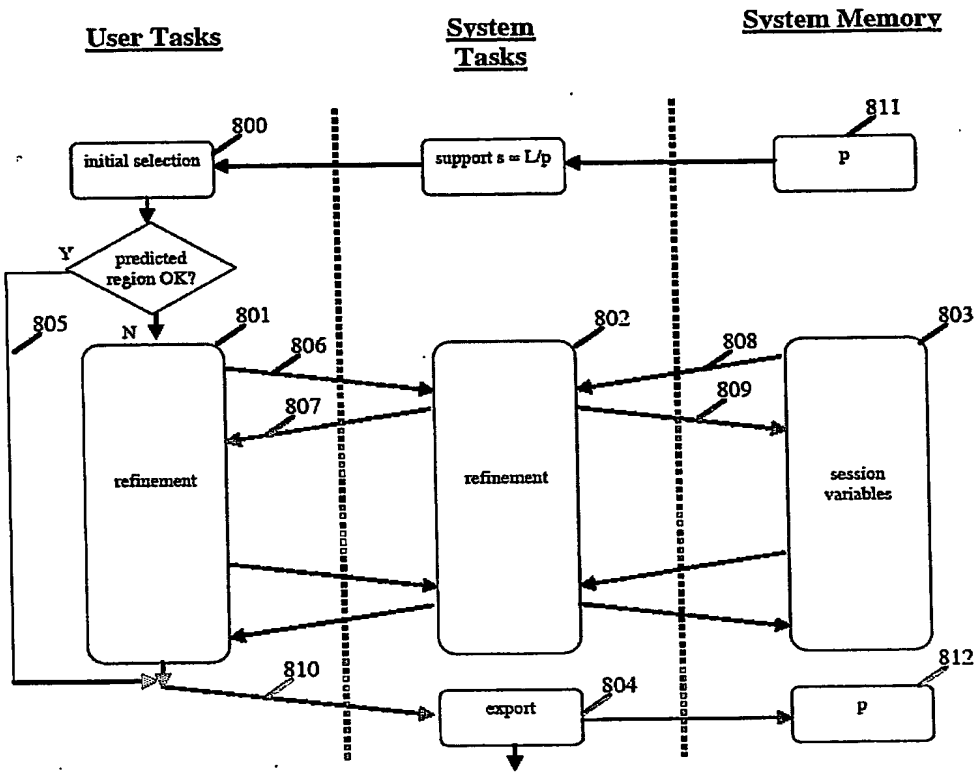

User Tasks
System Tasks
System Memory
800
initial selection
support s = L/p
811
p
predicted region OK?
Y
N
805
801
802
803
806
808
807
809
refinement
refinement
session variables
810
804
812
export
p

Figure 9

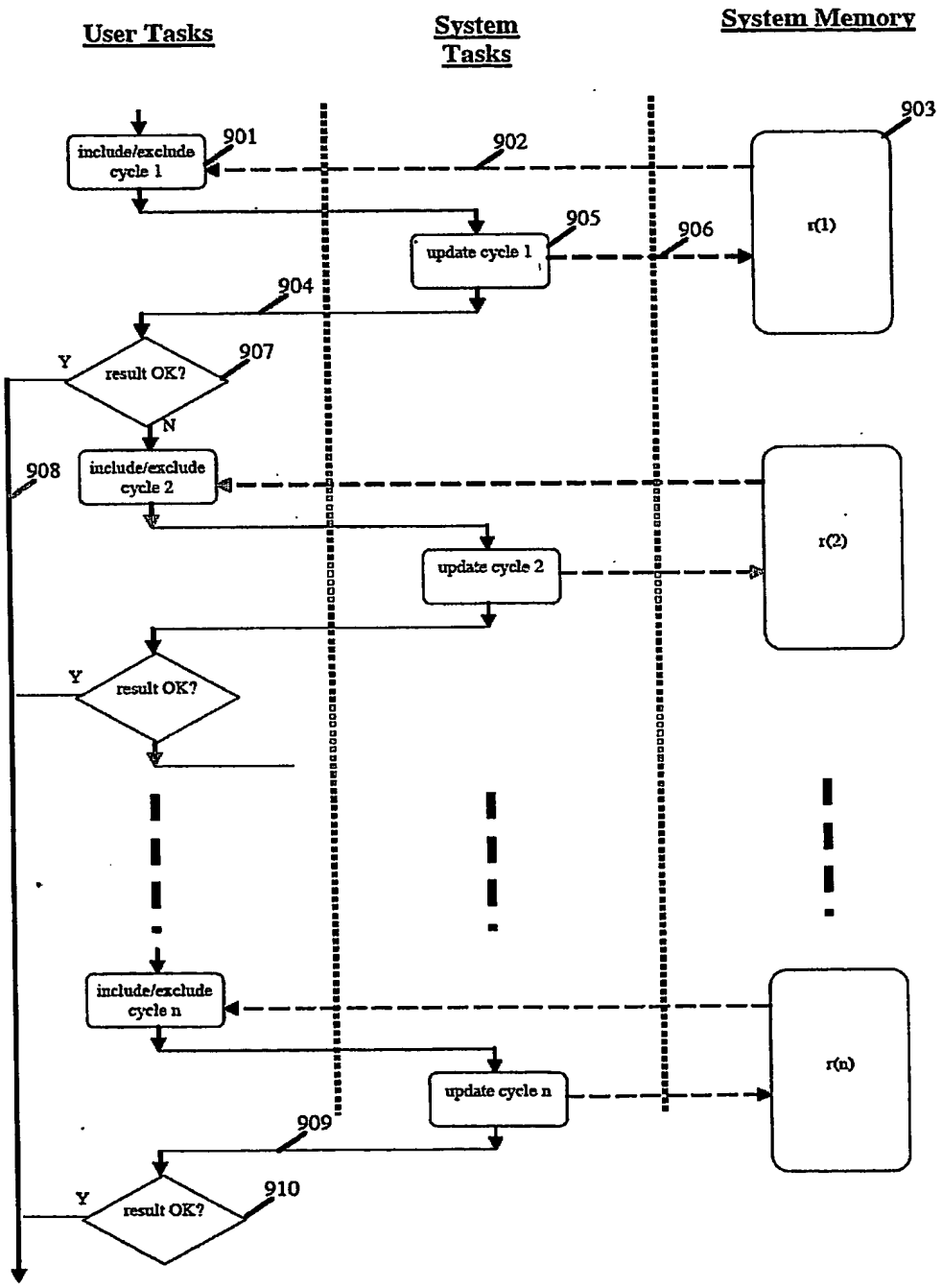

User Tasks
System Tasks
System Memory
include/exclude cycle 1
901
902
903
r(1)
update cycle 1
905
906
904
result OK?
907
Y
N
908
include/exclude cycle 2
r(2)
update cycle 2
result OK?
Y
include/exclude cycle n
r(n)
update cycle n
909
result OK?
910
Y

Figure 10

```
////////////////////////////////////////////////////////////////////
// example VXT control program

#define MAX_USER_INTERACTIONS      100

// session variables

static int p = 12;                                          // predicted value in s = L/p
static int r [MAX_USER_INTERACTIONS];

enum user_commands
{
        USER_MOVE_TO_FRAME,
        USER_INCLUDE,
        USER_EXCLUDE,
        USER_APPLY
};

void VXT_control_example()
{
        int L;                                              // length of video clip in frames
        int s;                                              // support in frames
        int current_user_input;
        int user_interaction_index;// count number of user edits
        int user_cycle_count;
        int inpoint, temp_inpoint;
        int outpoint, temp_outpoint;
        int f;                                              // current frame number

        L = getVideoClipLength();       // get the number of frames in the video clip

        // The support value s specifies the size of the block of frames to be
        // included or excluded in the refinement operations.
        // It is initialised to be some proportion of the original clip length
        // using the stored prediction variable p.
        s = L/p;

        user_interaction_index = 0;
        user_cycle_count = 0;

        // show the predicted include region
        f = L/2;
        inpoint = f - s;
        outpoint = f + s;
        temp_inpoint = inpoint;
        temp_outpoint = outpoint;
        showIncludeRegion(f, inpoint, outpoint, L, -1);

        // user input decode loop
        while (((current_user_input = getUserInput()) != USER_APPLY) &&
                        (user_interaction_index < MAX_USER_INTERACTIONS))
        {
                s += getRefinementValue(user_interaction_index);        // adjust s for this iteration
                switch(current_user_input)
                {
                        case USER_MOVE_TO_FRAME :               // move and include frames moved across
                                user_interaction_index++;
                                f = getCurrentFrame();
                                temp_inpoint = (f < temp_inpoint) ? f : temp_inpoint;
                                temp_outpoint = (f > temp_outpoint) ? f : temp_outpoint;
                                inpoint = temp_inpoint;
                                outpoint = temp_outpoint;
                                user_cycle_count = 0;
                                showIncludeRegion(f, temp_inpoint, temp_outpoint, L, -3);
                                break;
                        case USER_INCLUDE :
```

```
                        switch(user_cycle_count)
                        {
                                case 0:     // include current frame only
                                            temp_inpoint = f;
                                            temp_outpoint = f;
                                            break;
                                case 1:     // include s frames both prior to and subsequent to current one
                                            temp_inpoint = (f - s) < inpoint ? (f - s) : inpoint;
                                            temp_outpoint = (f + s) > outpoint ? (f + s) : outpoint;
                                            break;
                                case 2:     // include all frames prior to and s frames subsequent to
current one
                                            temp_inpoint = 0;
                                            temp_outpoint = f + s;
                                            break;
                                case 3:     // include s frames prior to and all frames subsequent to
current one
                                            temp_inpoint = (f - s);
                                            temp_outpoint = L - 1;
                                            break;
                        }
                        user_cycle_count = (user_cycle_count < 4) ? user_cycle_count+1 : 0;
                        showIncludeRegion(f, temp_inpoint, temp_outpoint, L, user_cycle_count);
                        break;
                case USER_EXCLUDE :
                        switch(user_cycle_count)
                        {
                                case 0:     // exclude all but current frame (equivalent to
USER_INCLUDE case 0:).
                                            temp_inpoint = f;
                                            temp_outpoint = f;
                                            break;
                                case 1:     // exclude s frames from front and back of clip
                                            temp_inpoint = s;
                                            temp_outpoint = L - s;
                                            break;
                                case 2:     // exclude s frames from back of included region
                                            temp_inpoint = f - s;
                                            temp_outpoint = f;
                                            break;
                                case 3:     // exclude s frames from front of included region
                                            temp_inpoint = f;
                                            temp_outpoint = f + s;
                                            break;
                        }
                        user_cycle_count = (user_cycle_count < 4) ? user_cycle_count+1 : 0;
                        showIncludeRegion(f, temp_inpoint, temp_outpoint, L, user_cycle_count);
                        break;
                }
        }
        inpoint = temp_inpoint;
        outpoint = temp_outpoint;

        // update the variables and export the clip
        p = 2*L/(outpoint - inpoint + 1);
        exportClip(f, inpoint, outpoint, L);
}
```

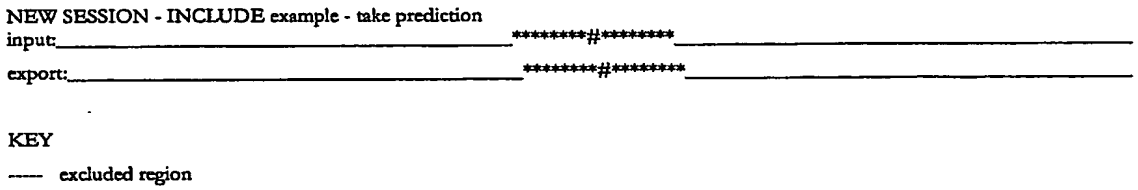
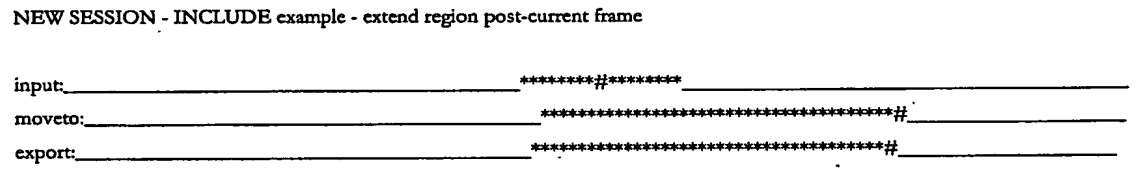


Figure 11



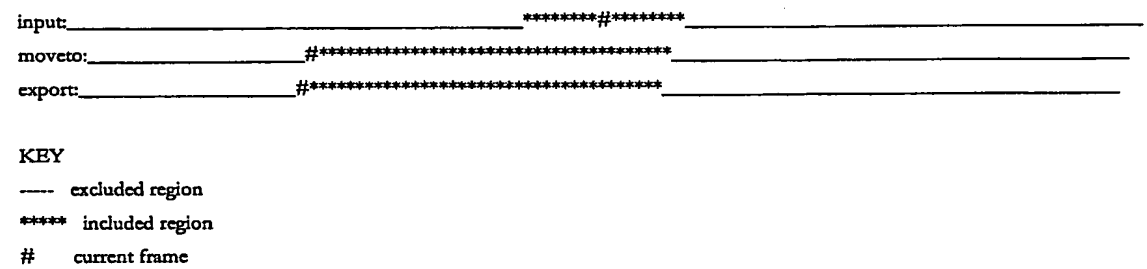
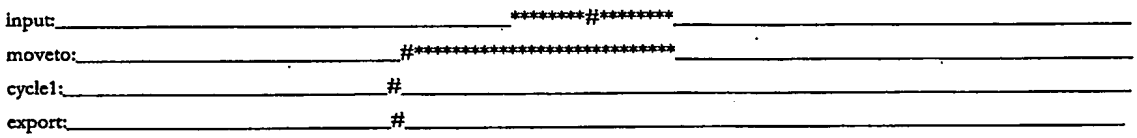


Figure 12

NEW SESSION - INCLUDE example - take 1 frame



KEY

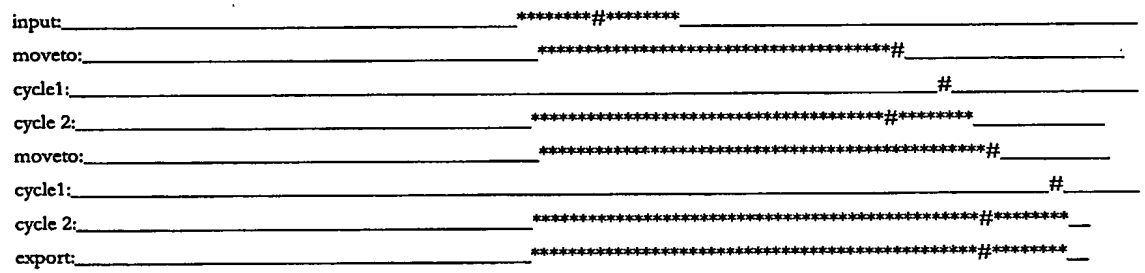
---- excluded region

***** included region

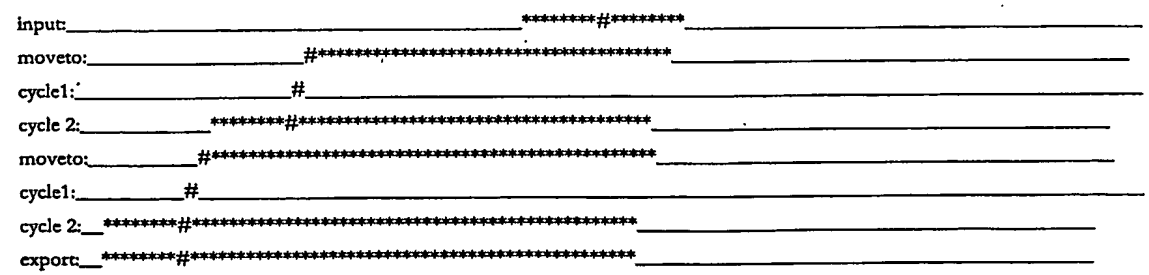
current frame

Figure 13

NEW SESSION - INCLUDE example - grow region post-current frame



NEW SESSION - INCLUDE example - grow region pre-current frame



KEY

---- excluded region

***** included region

current frame

Figure 14

NEW SESSION - INCLUDE example - include all pre-current frames

input:_____********#********_____
moveto:_____**********#_____
cycle
1:_____#_____
cycle 2:_____**********#********_____
cycle 3:**********#********_____
export:**********#********_____

NEW SESSION - INCLUDE example - include all post-current frames

input:_____********#********_____
moveto:_____**********#_____
cycle
1:_____#_____
cycle 2:_____**********#********_____
cycle 3:**********#********_____
cycle 4:_____********#**********_
export:_____********#**********_

KEY

----- excluded region
***** included region
# current frame

Figure 15

NEW SESSION - EXCLUDE example - exclude s frames from front and back of clip

input:_____********#********_____

moveto:_____**********#_____

cycle

1:_____#_____

cycle 2:_____**********#**********_____

export:_____**********#**********_____

KEY

----- excluded region

***** included region

current frame

Figure 16

NEW SESSION - EXCLUDE example - exclude s frames from front of included region

input:_____********#********_____

moveto:_____**********#_____

cycle

1:_____#_____

cycle 2:_____**********#**********_____

cycle

3:_____********#_____

export:_____********#_____

KEY

----- excluded region

***** included region

current frame

Figure 17